

A Review
of Ancient
and Modern
Violin
Making



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A review of ancient and modern
violin making

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A REVIEW
OF
ANCIENT AND MODERN
VIOLIN MAKING

BY
W. W. OAKES



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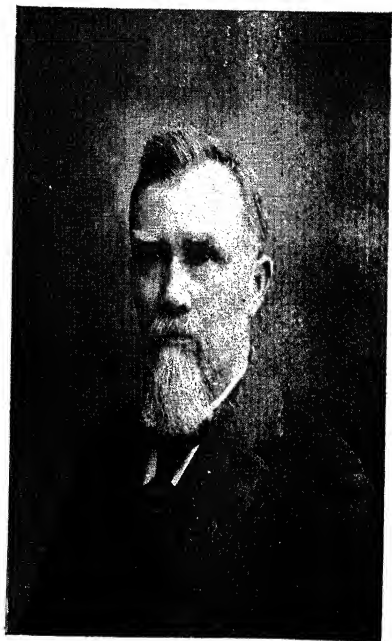


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Respectfully Yours
W. W. Oakes



INTRODUCTION

IN THE ARGUMENTS made in the following pages I may not succeed in convincing my readers that the position I have taken is impregnable, or even in creating a doubt concerning the superiority of the Cremona violins, with their host of attendant theories, but I hope to set my readers thinking, and if I can suggest the right line of thought, then, it will be the first step toward the revolution. A man whose convictions, though erroneous, are honest, is always ready to acknowledge his error when convinced of its existence. It is for this class of thinking, investigating people that this little book is intended, and not the blind and fanatical adherents to the "old violin" ideas, who are proof

against argument and fact, or anything that would tend to dethrone their idol.

Life-long opinions are not easily changed; it rather requires the most stubborn facts, long and persistently held forth, to effect a change, even in a small matter.

Presuming that the majority of my readers are disciples of the "old violin" school, as is very likely the case, it would be unreasonable to expect an immediate revolution in the opinions they have held so long.

It has already been asked, "Who is this man? We have never heard of him before. By what right does he ask for the acceptance of his theories, the adoption of which would overthrow those of time-honored belief?"

If I may be allowed to answer, I will say: As to the first, my signature at the beginning will inform you. As to why the world does not know me, it is because of circumstances, and until now of my own choice. In answer to the third, I claim the right that justly belongs to anyone who has clearly demonstrated the error of any theory.

If my theories are at fault, they cannot affect the old ones. If I am right, then the old errors should be swept away. That the violin

world will doubt many of my statements is only reasonable to expect, and that there are some who will doubt all is looked for. I only ask for an honest investigation.

In presenting this review to the public, I do not propose to give the history of the violin, or to follow the lives of prominent makers of any period. This has been so repeatedly and exhaustively done that there is nothing new to give. In all works of recent years, whether in book form or short articles, one only finds a repetition of what has long since become tiresome. No one need hope to create an interest on these old lines without some new matter.

The subject of the violin seems to have a peculiar fascination for a certain class of minds—minds which appear to be easily burdened with the subject, and find relief only in the frequency of their squibs, and when imbued with rather more than ordinary inspiration will tell us "How to make a violin." This information makes its appearance only a little less often than the changes of the moon, and is usually written by those who could make a longer and more interesting story of what they did not know about it. There has been too

much of this free instruction for the good of the craft, as there have been very few mechanical minds that have not at some time been fired with a desire to make a violin. This desire might never have reached fruition, had it not been for one of these "How to make a violin" articles, resulting in lacerated nerves for the hearers, and only wasted time and disappointment for the maker. Violin making is not a business to be acquired from any written instructions, or to be mastered in a few months, or a few years, as all who have achieved distinction will testify.

It is with great reluctance that I begin this task, well knowing my inability to present any knowledge I may be in possession of in an interesting manner. Talking is but little in my line, and writing much less. I am essentially a thinker, worker and investigator, and I would not go outside of these lines were it not for repeated requests of friends, who know of and believe in my work, and have confidence in the new ideas I employ in my methods of violin making.

I am well aware that a departure from the well established lines has always met with a cold reception, and as I have no reason to

look for a change in this respect, I am prepared for contradiction and ridicule; but I console myself with the firm conviction that the time will come, though perhaps not during my life, that the world will confess the truth of my assertion, and accept the results of my researches. No doubt many will rush into print, denouncing me for having dared to question the supreme and unerring ability of the old makers.

I shall make but little distinction between the old and the new, but what I do make will not be so much to the credit of the modern makers as it might have been had they been more self-reliant and improved their opportunities (infinitely greater than those the old makers enjoyed), and not followed blindly in the footsteps of their predecessors, who themselves had not fully solved the mysteries of violin construction.

There is no one who honors the old makers more than I. When we consider what they accomplished they are entitled to our most profound respect. They first conceived the idea of the violin, fashioned its form, and perfected its proportions so far as to secure for it the title "king of instruments."

CHAPTER I

*HAD THE OLD MASTERS
ARRIVED AT CERTAINTY?*

THE VIOLIN as it has stood for three hundred years, possesses all the possibilities it will ever have, so far as its general form and proportions are concerned. The old makers brought these up to a point that precludes the possibility of improvement, and all the clap-trap appliances to enhance its power, volume or quality only serve to show the ignorance of the maker, as not one of these obtain the results sought.

While the violin as a whole is all that it ever was, or can be, is there not something in its construction not fully understood? Has there not been an element of uncertainty, of failure, all down its history? I think this will

be readily conceded. Do you know of a maker from first to last, who can or could, turn out a class of high grade violins, without intervening poor ones? If you do, the world does not. For my part, I have never met one, neither have I read of one who made even a pretense of unbroken success.

Is it not a fact with all makers from the earliest history to the present, that the really good violins are the exceptions, and the poor ones the rule? This would not be the case if the proper method of construction had ever been determined.

The results of every other branch of mechanics condemn this of the violin, and are proof that the methods are at fault. In all other branches of mechanics the workman will turn out his work so as to accomplish the object he has in view. If a machinist makes a locomotive that will draw fifty cars, he should be able to duplicate the result. But, if in using the same material and plans he should produce, not only one, but a score that would only draw the tender, he would hardly be entitled to the term "master."

There has been an uninterrupted advancement in all branches of mechanics and science,

until the once supposed impossible is daily accomplished.

But we are gravely informed that the art of violin making reached its highest state of perfection in childhood; that the period of its birth witnessed its death; that all who followed have been groping in darkness, vainly seeking the "lost art;" and more nonsense of the same sort that I care not to mention.

Of those who believe this trash I will ask a very pertinent question: Why should violin making be the one isolated exception to this universal rule of advancement? There is no rational reason to be given. If the old makers had reached perfection, their work still survives them from which to gain a knowledge of their principles. It is not claiming too much when I say their methods have been, and are today, as well understood as they themselves knew them, and the results have been the same—a few good and many poor ones.

But granting that the art died with them, would it not be irrational to assume that this branch of art alone was stationary, rather than that the principle of progress had made the modern makers not only equal but superior to the old school?

While it is a fact that the old makers produced violins that have since been so improved as to make them hard to surpass, it is as clearly evident that they made many more that were comparatively worthless, though the conditions of time, place, climate and material were the same.

Not long since, a gentleman of considerable violin experience took me to task for saying that Stradivarius had ever made a poor violin. "Why," said he, "I never saw a poor 'Strad' in my life. Where are they?" In reply I said they had gone the way of all failures—they had found their level by falling into the hands of equally poor players. They had received rough treatment, and had long since disappeared, very likely in fragments, while the good ones had been only another illustration of the "survival of the fittest." They had fallen into the hands of those who could appreciate their rare value, and took steps for their preservation.

This not only applies to Stradivarius, but to all the old makers. When I say that the true principles of construction have never been reached I include all makers of all ages. If the poor violins were the exceptions, there

might be some grounds for contradiction. It might be urged that it was carelessness on the part of the maker, or owing to unfavorable conditions of the wood; but as a rule, the most signal failures have been directly after or preceding the most brilliant success. I have a violin now in my shop that for real tone value is not worth five dollars, yet the violin preceding it was sold by the maker for fifteen hundred dollars. The same form and wood were used, and the same care taken in the construction of both instruments. If the maker was a master, as he was probably called, why this difference in the two instruments when the conditions were the same? There is no other rational conclusion than that there must be some vital points in construction, that, if harmoniously united, would secure success for the one violin, and a failure to so unite them spoils the other.

As the poor violins are so largely in the majority, I am forced to the conclusion that the good ones are accidents. My researches satisfy me that there never was a maker, ancient or modern, who did not realize the lack of some knowledge in his art—an elusive, intangible something that stood between him and

absolute success. From first to last they have labored in an atmosphere of doubt, not knowing what the result would be till their work was completed and tested. This has been so much the case that it is universally admitted, and has passed into proverb, that "a maker cannot tell what his violin will be until it is finished."

This would not be the case if violin making had ever reached perfection. It was this lack of perfection in the old makers that has hindered the modern workmen, as they have worked on the same lines as the old makers, preferring to copy rather than take new lines of thought in the endeavor to avoid the numerous failures. It has been my privilege to gather the most minute details of a number of old instruments, and I found them anything but satisfactory. In examining two of the same model, and of equal merit, I found the interiors were plain contradictions. I have never found two of the same maker alike. I could only infer that the intentions in both were the same, with, however, a very imperfect fulfillment of that intention. Most of the old models differed less in outward appearance than in inner construction. What could be

more confusing to the student, when upon examining two violins of equal merit, to find the construction of one diametrically opposed to the other, or to examine two of the same maker, only to find as great a difference.

We have been furnished in the lives of the old makers what I consider most conclusive evidence that they did not regard themselves as masters of the art. They could not have done so, from the fact that they were so often radically changing the form and inner proportion of their work. If the success of any one maker had been uniform, he would have had no cause to change his plan of work, and others seeing his success would have copied his style. The latter part of the Cremona era would have witnessed but one form of violins, as all would gladly have given up a partial success for an assured one, or human nature was very different at that time from what it is today. But more of this later on.



CHAPTER II.



AS I SHALL handle all violin material separately, I will begin with the first in order, the wood. In considering this part of the subject it will be necessary to cover some considerable lapse of time in order to show to what extent the diversity of opinion has carried the modern workman, as the quality and kind of wood has always been a matter of contention.

While various kinds of wood were used by the old makers, history gives no definite information as to whether it was a matter of contention with them. We know their researches were widely extended, considering the period, and their experiments, no doubt, were carefully conducted according to their

light on the subject. No doubt they settled on the wood that gave the best results. But in all this and from other sources I find no proof that they attached nearly so much importance to the kind or quality of wood that modern writers would have us believe. We have no evidence that they had any preference for old wood, or that they resorted to chemical or other treatment to prepare it other than the natural process of seasoning. The old wood craze is essentially of modern origin, and is not justified by common sense or practical investigation.

It is generally believed that at about the close of the Cremona period there was a great falling off in violin making, which continued for an indefinite number of years, and when it was again resumed, there seemed to be a lack in the quality of work. When I wrote on this subject before, I took this general view, though at the time I had grave doubts as to its correctness. Since then I have given the matter considerable attention, and my former doubts have become certainties. I find that the art was more or less abandoned at Cremona, Bergonza being the last who attained to any distinction, but there were many who had ac-

quired the art previous to and during his time, and taken it to other places. There was no reason for keeping the art centered at Cremona, as the place was but a village and offered no special inducement. So the art drifted away, as we find that at about this time violins were made in England, France and Germany; in fact had been made in the latter country some years.

It was somewhere in the latter part of seventeen hundred that all the Cremona violins were changed by giving them the present form of neck, bass-bar and other internal changes. All of these violins have been in active use from the time they were made, and in consequence of the improvement in their tone quality gained thereby, their own makers would not have known them. They were practically different instruments as regards utility, power and quality. After the Cremona violins had been changed the more modern makers adopted the same changes. Now, even if the skill of modern makers had been superior to the old, the new violins would have had no chance in the comparison, because of the development of the old. But the modern makers did not understand this and accepted the apparent de-

feat. This defeat led them in some way to think that the wood must be the cause. Then followed years of investigation, in which numerous theories were advanced, acted upon and then abandoned.

In these researches we are told they traced the old makers to certain mountain slopes of Italy, where they had selected trees of some supposed fabulous quality, taking only certain portions, which they subjected to various chemical treatments. I am not aware as to what extent the modern searchers attempted to work on this knowledge, but it is well known that some did. There are some would-be makers at the present time using chemically prepared wood, but none of them have been in any way benefited as to results. They could not bring their work up to the standard, so they must look in other directions for the lost secret.

Then came an interval of quiet plodding, but the violin makers were always on the alert for anything that would advance the quality of their work. They were at last startled from their quiet and thrilled by the announcement that the "lost art" had been found. It was not by chemical treatment, nor was it in the

fabulous wood that had "absorbed the music of the murmuring brooks, the sighs of the evening breeze, the songs of birds and stored up the martial blasts of the fierce tornado." No; it was none of these. It was simply "old wood," very old, the older the better.

There is some doubt as to the identity of the brain that evolved this master stroke of ignorance, and for the credit of his posterity it is to be hoped it will never be definitely known. However, the idea was grasped with enthusiasm, unquestioned and without doubt. As the minds of all makers, students and connoisseurs had always turned to Cremona as the fountain of inspiration and confirmation of ideas, away rushed the horde, who swarmed over Italy like the locusts over Egypt of old. They haunted old churches, inspected old houses, bought and tore them down, while others went sniffing through old monasteries and bought all the beams the monks would let them have, and when enough had been secured to last a couple of centuries, they contentedly set themselves down to work out their longed-for success and immortalize their names. But they did not immortalize to any great extent, for their success was no greater than before.

They would now and then produce a fine instrument, as they had done before, but they adhered to the old wood theory with a tenacity worthy of a better cause.

It is but recently that a few observant minds have begun to lose confidence in the old wood craze, and yet I doubt if any can give a well defined reason for their belief in new wood. If the one who first advanced this theory of old wood had stopped to reason in the matter, he would have seen at once that the Cremona makers could not have used wood of any considerable age, for many years must have elapsed before they finally settled on what they considered the best. If enough had been cut at the beginning of their work to have lasted to the close of the Cremona era, it would not have been nearly so old as we find recommended today.

I received a letter but a few months ago from a gentleman in Maine, describing some wood in his possession, warranted to be over three hundred years old. I will, however, do him the justice to say he had more confidence in other wood that was but a few years old.

There is no evidence to show the old makers used old wood, nor is there reason to sup-



THE "OAKES MODEL"—Front View

This violin is made of wood that grew in the Sandwich Islands; It is known only by the native name "Koa."

pose they did, as they could not have had any considerable stock on hand at one time. As a proof of this, they were frequently found away in the mountains in search of wood, where they "superintended the felling of the trees, and selecting the parts that pleased them." This shows the age of the wood to be well within the lifetime of any of them. Some of their wood might have attained the age of ten or twelve years, possibly twenty, but I have no doubt that much was used within a year, as Italy has a climate in which wood will season in a surprisingly short time. One writer describes the room in which Stradivarius seasoned his wood. He says: "It was so built as to command the full action of the sun, and became heated like a furnace." This may have been the truth, but it was not very complimentary to the judgment of the old maker, for it is a well established fact that the nearer you approach kiln-drying the more the wood is injured.

The claim that the old makers gave the wood some chemical or other treatment to impart an artificial age is the merest supposition without a shadow of evidence; in fact it is

doubtful if any such process were known at that time.

But to return to the new makers. If they had been more conversant with the principles that govern the development of violins they would have had no cause to be discouraged by the comparison, as the old violins were well matured by age and use, while theirs were practically undeveloped. The test was altogether one-sided, especially so when we consider the fact that none of the makers of that day, or before for that matter, were sufficiently advanced to impart the effect of maturity by graduation and other internal work.

↘ The time was when a violin could only be developed by age and use combined. That, however, is no longer the case, of which all my instruments are ample proof. That the new work did not come up to the old is no proof that they were inferior instruments. The new work might have embodied the elements of superior violins, when fully developed, and yet be defeated in an early trial.

For the last fifty or seventy-five years, the world has been assiduously taught that modern violins can in no way compare with the old. This belief has become so general that

one is looked on with suspicion if he expresses a doubt of its truth. The result of this is that an impartial trial is out of the question, however honest may be the purpose of the judges. While there are thousands who honestly believe in the old violins, there are many others who claim to believe in them who do so solely for personal financial reasons. They have large sums of money invested in these old instruments, and it is to their advantage to foster this delusion on the part of the public by every means in their power, and for this purpose they buy the opinions of noted experts and pay a goodly sum for the same. They can well afford to do so, for the most of these old relics cost but a nominal sum, and by their manipulations give returns of many hundred fold. These people will not give an honest opinion on a modern violin, or allow their hirelings to do so, neither can they be coaxed or driven to an honest test, but will avoid it in some way unless the verdict has been "fixed" in their favor. But there are many who are having their eyes opened to the truth of this matter, though it has been long coming.

Norway has not adhered to the old violin theory. Her people, almost universally, have

no use for the very old violins, except those who are too poor to afford new ones. I have it from the best authority that scores of these old instruments could be bought for a few dollars each, and many would be given away if asked for. I have been informed by the Rev. N. S. Waaler, a native of Norway, that the celebrated Norwegian violin maker, Knute Elfson, who took the gold medal at the Paris Exposition, has the same opinion of old wood, and old violins that I have, and that our investigations have been along the same lines and ended with the same results, though each was ignorant of the other's existence and had not made public his ideas.

As regards the condition of wood, my researches have given the most incontrovertible testimony to the fact that when wood has been cut in the proper season (any time between December and March) and split in the rough to the proper thickness, then placed under shelter where the air can have free action for eighteen months, no added time or condition can enhance its value or add to its resonant qualities. In this matter I have had the most extensive opportunities for testing wood and violins of all ages. In the forty-five years

of my study and work many hundreds of violins have passed through my hands, some of them having an age of 250 years. I have carefully examined the wood of these violins, and compared them with wood of corresponding age, and have followed this line of comparison down to the present. I admit that the wood does not show as much decay as the violin of the same age. The fact that old wood shows unmistakable signs of decay (in fact the most of the old violins are nearly gone with dry rot) should be reason enough to condemn its use.

It is generally believed from past teaching, but not from scientific investigation, that a violin will improve through all the years of its life. This cannot be shown to hold good beyond fifty or seventy years, and then it is largely owing to the amount of wood left in the plate. It should be remembered that all nature is governed by certain fixed laws. While decay may be retarded in its effect, it cannot be overcome. All growth has its birth, maturity and decline, and final decay is the inevitable end of all. As some one has said: "All created things contain within themselves the seeds of their own destruction."

Wood can be no exception to the rule. It naturally follows that when a violin attains its maturity it must enter upon its period of decline, and decline foreshadows its death. How many of the once famous violins are there to-day that are what they have been? I think I may safely say there is not one. They are mere wrecks of their former greatness, caused by the loss of their powerful tone; the fire of their maturity is gone, and they retain only an increased pathetic sweetness. The fibre of the wood seems to lose its life by the long-continued vibration, even as much as by age. This fact is more plainly shown in the piano. It is well known that pianos will retain their fullness of tone only for a few years, if much used. Twenty years is the limit, and but very few seem to know why. The cause is very simple, and the remedy also. If the soundboard be renewed the tone will be fully restored. The piano loses its power so much sooner than a violin, because of the greater amount of vibration from steel strings being so powerfully struck.

As nearly all violins when new have a comparative rough tone, it is this vibration that wears the roughness away. If the effect of vi-

bration could be stopped at any desired period the violin would retain its power very much longer. It is well known that a violin might be laid away for a hundred years, and still possess the same characteristics it had when first made, except in some loss of power caused by age.

With regard to testing wood, I very much doubt if the methods adopted have been sufficiently accurate to faithfully demonstrate what kind of wood was the best. If those conducting the test decided by the degree of resonance of the plate, it has not proven a safe guide, of which the poor results bear witness. Or, if they selected a less responsive quality, they were confronted with the same results—a few good, and many bad. As it stands, no rational choice can be made of the various woods used, for the fault is clearly more in the maker than the wood. When a workman is able to make two or more violins just alike, he may then make one of a different kind and quality of wood, and if he follows the same lines of construction he will then obtain a true test. This is absolutely the only way by which a true test can be made. If this statement is granted, then a true test has never

been made, for it has been universally admitted that no one can make two violins of the same power and quality of tone, which indeed has been the case all down the years of violin work. If the maker does not know what his violin will be while under construction when using a well known quality of wood, what chance will there be to test a doubtful quality? If it is guesswork for the good wood, it must be the same for the poor. As it now stands, the results are not governed by design, but entirely by accident, and the poor wood has an equal chance of becoming the best violin.

In numberless instances makers have used the greatest caution in selecting their wood. Their test of resonance, etc., was perfectly satisfactory and a pronounced success was confidently expected. The resultant failure did not shake their faith in the wood, or their confidence in themselves. They made no attempt to fathom the mystery, but went blindly on in the same dark path to renewed disappointments. When they had used a very ordinary class of wood and had blundered into making a fine violin, it caused no shadow of doubt as to the correctness of the good wood theory.

They did not notice the inconsistency, or stop to reason out why they met with as much success with common wood as with the approved quality. If the quality is of the first consideration and a man makes a dozen violins with the same care and accuracy, why are they not all good and equally good? It is a simple and positive proof that the theory is not correct.

As regards old wood, I wonder how good level-headed men could have been led to regard it as the proper thing, without such an investigation as would surely have revealed the fallacy of the theory. I take it for granted they could not have given it much attention without seeing the decay—without seeing the life of the wood was gone or going. If so found, common sense would demand its rejection. In building a bridge, the safety of which depends upon the strength of the wood used in its construction, the builder would not select a tree that had been dead for two hundred years, but would use new wood, possessing all its life and vitality. Then how much more does it require young and vigorous wood to resist the astonishing pressure that a frail violin must stand.

But strength is not the only requisite. Its

essential quality is resonance, which can only be found perfect in new, firm wood. One would as rationally expect to find the vigor, endurance and activity of twenty-five in the man of one hundred years as to look for perfect resonance in old wood. The longer I investigate this matter, the more firmly am I convinced that, so long as wood is young, the class, or kind is of secondary consideration. By the variety of wood I have used in the last four years and the uniformity of results, I am forced to this conclusion. I have used wood for the last fifteen violins that grew as widely separated as one could wish for the most extended test, and the quality has differed as widely as their respective locations. I have used wood from Norway, Sweden, Italy, Canada, the Eastern and Middle States, Pacific Coast and the Sandwich Islands. I have chosen the greater part of it for its beauty regardless of its fitness as viewed by other makers, and the results are that they are all undoubtedly equal to any violins in the world.

Makers have made a scapegoat of so-called poor wood to carry off the sins of their ignorance. If the good violins of all ages were produced only by this fabulous wood so much con-

tended for, then there has been but very little of it found, if one may judge by the innumerable failures. When or by whom the idea that a violin must have soft wood for the top was first started and finally settled upon I do not know, but I have proven to my own perfect satisfaction that the theory is wrong. That he, or they, in conducting the experiments have shown a lamentable lack of qualification for such work. This matter has been the ground of as much theorizing as any other part of the violin. These theorists have blindly accepted the statement without investigation, or if investigated at all, it was conducted with as little science as by those who first established the theory. My researches show that any wood that is proper for the ribs and back is even better for the top than wood of a different density, and consequently of a different nature. The fact will appeal to common sense that the same wood throughout will give a more uniform vibration. All that is required to make this a success is a slight change in the graduation, and also a change in air capacity, varied according to the density of the wood. These facts will eventually be recognized and accepted. No doubt there will

be many failures, and the system condemned in consequence. These failures will result from inexperience and lack of judgment, rather than from any fault of the system.

As a last and final proof that success is not owing to a certain quality of wood I will give a recent test. I bought a violin (Hopf), for which I paid \$2.50. I need not describe its worthlessness, as all who have seen the brand will know. It will suffice to say that it was dearly bought. Reasoning from the "good wood" standpoint, the poor quality of this violin was owing to poor wood. If this was so, it must be admitted that no skill could have averted a failure in the first place, or redeemed the violin by after work. But the fact is, I have reconstructed the violin, and it now ranks with the first instruments in this or other countries. I venture to say there is no honest minded man, however firmly he may believe in this theory, but will admit that the improvement was due to a thorough knowledge of how to work the wood and shape its proportions, though in this case, as in thousands of others, the wood had to father the ignorance of the maker.

If all violin makers will strive for perfec-

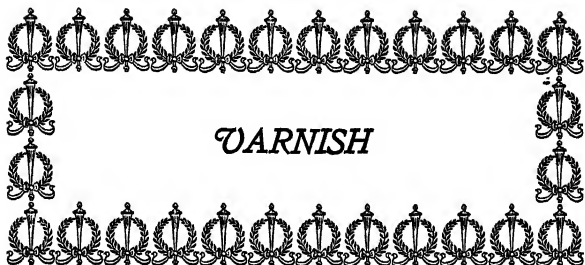
tion in work and depend less on quality of wood, their work will have a much higher value. Before closing this section, I wish to notice and examine a practice followed by many makers, the folly of which should be apparent to any one acquainted with even the rudiments of violin science. These makers will not use wood that will not yield a certain tone when struck. The tone sought for, I believe, is C natural. No doubt they have a theory that is satisfactory to themselves for this proceeding, but on what scientific ground it was established is more than I can tell. They ignore the fact that the letter tone of any piece of wood is determined by its size, so, if the piece of wood they are testing should give the tone A or B, all they would have to do would be to shorten the piece, which would sharpen the tone until it reached C, or any other tone in the scale. When they find the wood that gives the sought-for tone, they begin to shape it for the violin. Every shaving they remove changes the tone, and by the time it is in place in the violin it will have run the chromatic scale several times.

But granting the plate happened to be of the right tone (for by no possibility could this

be done by design), when it was ready for the varnish, the first coat would change it a little, the second one still more, and so on with every coat. Nothing short of the Infinite mind could tell what the tone would be at the last stage of varnish. Then when the varnish is being rubbed down, every rub changes the tone a little. Where will it be when done? There is just one chance in every ninety-six of obtaining the tone C. This is allowing for the sixteenth of a tone. But granting that they have succeeded in retaining the letter tone throughout the course of construction, wherein is it better than if it gave B or D, or any other tone? The most superficial observer can see that the theory is the merest nonsense.



CHAPTER III.



IT IS with great reluctance that I approach this part of the subject, knowing as I do that all who have even a fancied knowledge of violin lore so strongly adhere to the belief of the supremacy of the "Cremona varnish" that nothing short of a thunderclap of evidence could shake them out of the common rut of misconception they have been laboring in. An idea that has been so long and so universally accepted, however erroneous, becomes nearly sacred, and to express even a doubt of its entire truth would be nearly sacrilege in the minds of many. Nevertheless I shall adhere to that which proof has established, though I should stand alone to the end.

I have no reverence for an error because of its age and general acceptance. All this can not justify its existence. My researches along this line have established such convincing proof of these errors that the most skeptical must accept their existence as a fact, as has been the case with a number of gentlemen of high musical authority who have been watching my work and investigations for the last three years, and who now most thoroughly indorse my proof, although they were at first uncompromising believers in the mysterious power-giving quality of the Cremona varnish.

When the old wood theory had failed to secure the success that was so confidently expected to follow its adoption, some of the more progressive began to look in other directions for a remedy. It is useless to follow the various methods resorted to in their attempts to overcome the supposed obstacles. A fine instrument was occasionally produced, but what they sought for was a uniform result. Failure to accomplish this has been the one insurmountable obstacle in all ages of violin making. When they produced a violin of high merit only to have the succeeding one a failure was a stupefying mystery for which the makers

never for a moment blamed themselves. They could not have inquired very closely into the work of the old makers or they would have found that they also labored under the same difficulty.

Just when varnish was first considered of such vital importance is a matter of conjecture. It was evidently not of rapid growth, but when it was finally accepted they gave it their full, unwavering confidence. I have found nothing that would lead me to think the old makers regarded it as any benefit aside from beauty, but rather as a detrimental necessity. It was not until after varnish had been surrounded with mystery that it became the supposed chief factor. If one can manage to attach a little mystery to the most commonplace object, it at once assumes most wonderful proportions.

It is highly probable that at the beginning of what we call the "modern period," the makers used the same varnish that the Cremona makers did. Of course there is no positive evidence of this, neither is there any proof to the contrary; but I am satisfied that when the conditions and circumstances surrounding the two periods are fully understood my opinion

will be sustained. From the year 1500 to 1800 was not a period noted for inventions or much improvement. Implements, formulas and manners of procedure in all lines of industry and science were practically the same. If a man pursued a certain line in any calling his great-great grandchildren were in the majority of cases found plodding along in the same path, using the same unimproved methods.

In the absence of evidence it would be presumptuous to assume that varnish was an isolated exception, while on the other hand it would be very reasonable to suppose that whatever the varnish may have been when first called into use for violins, it passed through the whole violin period without change. It has been claimed that the old makers used great caution in preserving the secret of their varnish. This is entirely a supposition. What was known to one was known to all who followed the same pursuit. All craft knowledge was handed down in legendary form, and there was nothing to prevent the widest spread of any such knowledge among the makers, who were far more numerous at the close of the Cremona period than at any time previous, though they were more scattered.

But the modern makers, having failed to accomplish what they supposed the old makers did, and not finding the remedy in anything else, naturally turned to the only remaining uninvestigated part in which the fault might lie. They at last concluded that the old makers must have used in the varnish some ingredients that they of the latter period did not understand. This idea soon became fixed in their minds, and increased in importance until the re-discovery of the missing compound was considered essential to success. This was at a period when inventions were no novelty and improvements were of daily occurrence. It would have been a matter of surprise if varnish had been left out of the general advancement. There was a demand for its improvement that had not existed before, and it would have been strange, indeed, if the more fully developed science had failed to meet the demand. This improvement was no doubt retarded by the false impressions formed of Cremona varnish. They must find the lost art. Italy was again besieged by the student, Cremona invaded, and all the old musty papers that had escaped destruction were fished out of dusty cracks and cupboards. But

the coveted recipes were never found. The search was kept up for years, with no better success, and I am not sure that it has been abandoned yet. However, the modern makers showed the good stuff of which they were made by a close application to what they did know, meantime searching for improvements.

Then began the search for rare gums and solvents to re-discover the lost art, and it has been continued ever since, with the result, if one can believe reports, of the true Cremona varnish having been re-discovered about a hundred times, with as many different formulas. What a variety of varnishes the old makers must have used, to be sure. What a world of trouble, time and expense could have been saved, if the searchers had stepped into a cabinet shop in Cremona. There they could have bought all they wanted of the very same varnish that the Cremona makers used, and not a very good varnish at that. This is now known to be a fact. The only difference was in the coloring, the violin makers merely adding the shade of color they desired.

There has been a very gratifying result arising from these researches—they have ended in producing an infinitely better varnish

than the Cremona makers ever dreamed of. I find that in order to admire what little remaining varnish the old instruments still retain, one has to draw as largely upon his imagination as he would to admire some of the paintings of the old masters. I have very carefully examined numbers of these "specimens of beauty" of the old makers, over which so many rave and become incoherent, and I frankly admit I cannot see the beauty. I have seen men go wild with delight over some old wreck, which, if shown as modern or middle age work, would have been turned from in disgust. There are thousands of men who will "gush" over the smallest detail of a Cremona, while right beside it may lie a modern violin far superior in every respect, yet pay no attention to it. The truth is, there are better finished violins made today by numerous makers than in any other age, and would be so acknowledged by many, were it not for the fear of antagonizing the Cremona fad. Many of them have no knowledge of these matters, but have accepted and believed in the universal opinion.

There is another fallacy of no small proportion that has been promulgated by a cer-

tain class of writers, and been adopted by many makers who have no better foundation than their imagination. I refer to the "amber varnish." There is not a word in the records of the old masters that refers to amber. Just when or by whom this theory was first started is difficult to determine, but I very much doubt if the author expected it to be accepted as true. It is indeed very doubtful if there was any process known at that time by which amber could be liquified. Even today, with our modern appliances, there is only a small proportion of the amount subjected to treatment rendered soluble. So far as my researches have extended I find nothing to justify the claim.

It was not my intention at first to quote from any work, as but very little could be found of a friendly nature toward my position, but in this instance, I am pleased to say, I do not stand alone. I will quote from an article in the *Atlantic Monthly* of February, 1880, by Richard Grant White, whom all will admit is very good authority. He says, in part: "When I wrote 'Seeking a Lost Art' I recounted some of my experiences in trying after the Cremona varnish, but I left my readers

uncertain whether or not I had discovered it. I now acknowledge I did not do so, and at the same time declare my conviction that Mr. Colton, of Brooklyn, has done so. And after all it proves to have been an open secret—no secret at all. I have discovered that all the talk about amber in the Cremona varnish was all nonsense. It contained no amber.”

Mr. Colton obtained undoubted evidence that the Cremona varnish was used three hundred years ago by all fine workmen in wood, not only on violins, but “on flutes, virginals, clavrichords, tables, chairs, etc.”

This evidence, with other of like import, added to my own researches, is all the proof I, for one, require to satisfy me that amber had no part in the Cremona varnish; in fact, chemical analysis has settled that point definitely. Neither was the varnish in any sense a lost art.

It has been claimed by modern writers and others that it was an oil varnish. I have searched to find some creditable evidence to support this claim, but candor compels me to admit that such proof has not been presented in anything it has been my privilege to read. If one will read carefully where this question is discussed, he will find that the evidence pre-

sented is only an illogical opinion, void of proof or rational conclusions. From certain circumstances which they elaborately explain, they infer that oil varnish was used. I will give a sample which contains as much proof as any I have met with. The article from which I quote ran for some months in the Boston Leader under the title of "How to Make a Violin." The author's name was not given. I am pleased to say, however, he was better informed on the history of the violin, violin makers and numerous other points than any other writer I know of. He was a firm believer in the "Cremona oil varnish," and as grounds for his belief he gives the following: "In a letter from Stradivarius to a clergyman he (Stradivarius) says: 'Pardon the delay of the violin, occasioned by the varnishing of the large cracks, that the sun may not reopen them.' "

Such was the letter; now follow the author's comments: "A delay caused by the varnish not drying. It is evident that this was an oil varnish, as no apology would have been required if spirit varnish had been used on account of the shortness of time required for spirit varnish to dry."

I would ask in all seriousness, if a careful



THE "OAKES MODEL"—Back View

student of facts could be expected to accept this as an evidence of the use of oil varnish? Let us examine this same letter and see how far the facts justified his conclusions. In the first place, no new violin has large cracks to be filled; and secondly, if the cracks were of such a character that the sun might open them, varnish would be no hindrance. Besides this, violins are never exposed to the rays of the sun. It is more likely that the violin referred to was a broken one that had been sent for repairs, and after having glued the cracks Stradivarius gave it varnish that dampness might not soften the glue and thus open them. It could not have been the sun he feared, as this would have glued the cracks more firmly.

But granting this to be correct. The length of time required for the varnish to dry was not stated. It might have been only one day, while even a month would have been no proof that it was an oil varnish. I sometimes use a spirit varnish that will not dry under three months sufficiently to finish properly. This might have been taken for an oil varnish with much greater appearance of truth. It is remarkable what a small degree of evidence will satisfy one when it points toward what he wishes to believe.

There seems to be an inclination with many to accept as true any statement touching the violin, especially if it refers to the Cremona period, and nothing seems too ridiculous to find believers. I could give scores of instances that are most inconsistent, yet are largely accepted as facts. In defending the Cremona oil varnish theory, one writer admits that this varnish can be cut with alcohol at any age, but adds in defense, "It is made with essential oil, which yields to the action of alcohol." This is a little in advance of the usual degree of ignorance dished up for our acceptance, but it serves to show what little reliance can be placed in most of the past violin theories. How one so ignorant of his subject could presume to write for the instruction of others is hard to understand, unless he took the view that where so much was false a little more could not work greater harm. He could not have known that essential oils are all volatile and contain no part of vegetable oil; that it is, in fact, the groundwork of spirit varnish, the solvent of gums of which spirit varnish is made. Even admitting that the old makers used oil varnish, it does not necessarily follow

that oil is superior to spirit varnish. Their opportunities for investigating the fitness of the respective varnishes were not in advance of any other scientific subject, and all know that such matters were barely in their infancy at that time. It is therefore very reasonable to suppose they were equally limited in this direction. On the other hand, our opportunities and facilities on this line have kept abreast of all other improvements, and according to the general law of progress we should have the solution well in hand, as there have been hundreds of minds in our age brought to bear on this subject where there was one in their age, and it would be strange indeed if we had not attained a higher standard.

If we had no proof aside from the piano maker, it should be enough to settle the question of supremacy between oil and spirit varnish. It is a recognized fact with all expert piano makers that the sounding board is of the first consideration in tone quality. The material and construction of the other parts may be of the very best, but with a poor sound board the piano must take a low grade. This being the case, the maker must stand or fall

according to the excellence of his sound board. With this fact in view, I would ask the advocate of oil varnish why it is that all piano makers, without exception, use spirit varnish for the sound board? It is because they have demonstrated the fact beyond doubt that oil varnish deadens the vibration, and that the best board made will be ruined by its use.

However firmly one may be established by positive evidence on any subject, he feels reluctant to give utterance to his convictions when he knows he stands alone in his views. It is in this position I find myself in what I am about to state, unless I may except the gentleman of whom I have previously spoken as having watched my work for the sole purpose of convincing themselves of the truth of what I have already written, and especially of what is now to follow. From my long continued experiments I am forced to the conclusion that there never was, and am satisfied there never will be, a varnish made which will not injure the tone of a violin. This is no doubt a startling statement, when we consider the vast number who honestly believe that the main feature of success lies in the power-giving quality of varnish. But I speak from years

of experience and investigation, and know of what I speak.

The question is not which varnish will most aid the vibrating quality of a violin, but which is the least injurious. In answering these questions, I will not explain in detail the long and tedious process of experiments by which I reached the evidence of the ruinous effect of varnish, but will give an easy proof of the fact, from which may be gathered my method of partly counteracting the evil. Let any of the best workmen make a violin that can be safely called a first-class instrument, when in the white. The tone must be full, firm and round, quick of response and brilliant. Now, he may select the varnish in which he has the most confidence and finish in the most approved manner, giving it all the time he wishes to mature, from a week to five years. Then when it is tested, if it is as good as it was in the white, or if it ever reaches that degree of excellence it then possessed, I will cheerfully make a public apology and frankly admit that the years of investigation I have given this branch of the art have been worse than thrown away. I have conducted a number of such tests in the last two years,

partly for the satisfaction of the gentlemen before referred to, and partly to test new varnish, and the results have all been the same. This naturally leads up to the question I have often been asked, "If varnish is an injury, why use it at all?" Because it is a necessity. It is to guard against the action of the atmosphere, heat, cold and dampness. But there is another reason of far greater importance. If the wood was not thus protected, it would absorb the animal oil from the hands and in the course of a few years the violin would be irredeemably ruined, as this oil never hardens and enough would be absorbed to kill all proper vibration.

Then comes the very natural question as to what varnish will do the least harm. I have no hesitation in saying that spirit varnish is the best. It is very much lighter, does not penetrate the wood so far, dries more firmly and becomes far more resonant than oil, and if the proper gums are employed will not become brittle or crack, while oil varnish is forever a dead, unresponsive weight. The idea that oil varnish will harden enough to become resonant is erroneous in the extreme. True, it will harden in time, but it is as voiceless as leath-

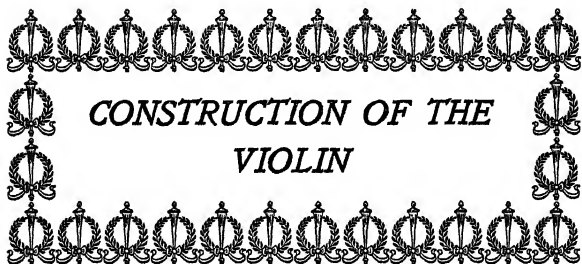
er. However conducive to perfect resonance the gums may be in themselves, their incorporation with the oil destroys this quality. It is claimed by many that spirit varnish gives too much brilliancy and makes the tone too metallic. No such quality was ever imparted by any varnish. The fault lies first with the violin. This can be proven by removing the varnish, after which you will find the tone even more metallic than before.

I have often been asked how all the fine instruments have been produced, if my theories are correct. My answer is, they are accidents. The graduation has been carried too far, the thickness of the wood being reduced so much that all solidity of tone is destroyed. Instead of the proper vibration, an uneven shake with no brilliancy would result. Several heavy coats of varnish have been applied, the weight of which has stiffened the wood and in part compensated for the wood lost in the too thin graduation, and a fine instrument is the result. Here is where the fine discrimination in the quality of wood is essential. Had the wood in this violin been of a different quality it might have had the very same graduation and turned out to be a first-class instrument

when tested in the white, but it would have been ruined by the same varnish that saved it in its first condition. I will try to make this more plain by reversing the order. We will suppose the maker has completed a violin, leaving it in the white. It has been strung up and properly adjusted, and it has proved to be in every respect a first class instrument. Now, as I have previously shown, the varnish will have an injurious effect, as the wood was in its best condition for perfect vibration, which is deadened by the weight and thickness of the varnish. This can only be overcome by equalizing the deadening effect of the varnish by reducing the thickness of the wood as much as will equal the weight of the varnish, or in other words, the graduation must be carried beyond the point at which it would be the nearest to perfection in the white, but only as much as the weight of the varnish will restore. To accomplish this without a mistake requires a knowledge of the various qualities of wood that few possess. After all the years I have devoted to this part of the art, it is only occasionally that I have enough confidence in the nature of the wood and the graduation necessary to finish the work without first testing it in the white.

It will be readily seen that no rule could be formulated by which a maker could secure success without years of study on these vital points. Even then he would have to possess marked ability and judgment not only regarding wood, but also tone quality, to know from the tone produced just when and where to stop to successfully meet the change the varnish will make. I am sometimes obliged to open a violin after it is completed to remedy some slight miscalculation, to equalize and harmonize certain points that are at variance; but this is a simple thing to do when the various parts are wrought out in harmony. This is the point where a fine judgment of tone plays its most essential part. When I have reached the stage where the violin is first tested in the white, I lay aside all rules that have governed the work so far and from this point I am guided entirely by my ear. If there is a fault, however slight, my ear detects it, my judgment locates it, and my long experience works the remedy; but it is very seldom my ear is called upon for more than approval.

CHAPTER IV.

*CONSTRUCTION OF THE
VIOLIN*

IN DEALING with this part of the subject it will be necessary to combine more or less of what has already been gone over, as in some cases it will have to be viewed somewhat separately for a better understanding of certain points. This will embrace much that is new, and what may be to many rather startling, but not more so than I found it to be in my own case.

In order to make it as comprehensive as possible without entering on a course of instruction, which is not my purpose in any sense, I will start at the beginning and trace briefly the line of thought that eventually led up to the adoption of a system wholly at variance with the long accepted principles of violin construction. Without this system I firm-

ly believe no one can ever attain to that degree of perfection that will enable him to produce a line of work all equal in merit, or ever make two violins alike.

I cannot remember the time when I was not deeply interested in the violin. The very sight of one would satisfy the cravings of hunger, and under the influence of its music the terrors of fire or flood disappeared. I had no consciousness of time or surroundings, and all was a blank save the violin and its wonderful influence over me. I have no recollection as to the time when I first resolved to be a violin maker. It must have been very early in life, for the desire seems to have always been with me. The consequence of this was an eager study of anything that touched this subject, but it was no easy matter fifty years ago to find detailed instructions, and more especially to find two treatises on the same subject that agreed. The diversity of opinion on what was then considered most vital points was very discouraging. But I reassured myself with the thought that the violin makers would agree. However, investigation proved them as widely separated in practice as I had found the theories. But the greatest disappointment

came when I found that even the best makers were more likely to produce poor violins than good ones. This fact prevented me from becoming an apprentice, for I could hardly hope to accomplish more than my teacher. Poor violins were on every hand, while a really good one was so rarely found that the happy possessor was greater than a king in my estimation. The good and the poor could not be distinguished by the looks. Then the question came to me: "Why not all be made equally good?" I felt that this difference should not exist, for as long as a maker might produce a poor instrument, violin making could not be truthfully called a science. I resolved to change this order of things, or never be known as a violin maker. I felt it to be an art too profound to be dragged in the dust by my ignorance, for I could not lay the failures to anything but lack of knowledge. But where and how should I begin? Could one be placed more utterly in chaos? I think not.

I had already found that there was no true basis from which to study a violin, from the fact that two good instruments might present conditions of construction diametrically op-

posed to each other. No wonder there was a diversity of opinion, when the violins themselves were plain contradictions. All makers had worked from some high standard of excellence, all the best violins had been copied most minutely, only to end in disaster. This was evidently not a safe line to follow. After this conviction came a period of the most persevering application to study, by which I hoped to find some ray of light that would eventually reveal the cause of so many failures. I at last decided to confine my study to such finished work as contained scarcely an element of good, to confine myself wholly to poor work, to study its defect, and if possible to find the cause. I reasoned that if the cause of a defect was found, the remedy was possible. I at last became convinced that absolute success could never be obtained on any other line.

Then began the work that took twenty years to accomplish. It was slow, and often discouraging work. One less determined must have given it up. But I always enjoyed a sufficient measure of success to keep alive the determination to succeed. If I were in search of the cause of a weak string, or weak note on any string, or a too prominent one, a flabby

or light metallic tone, or any of the numerous defects that will condemn a violin, and succeeded in doing so, I was quite as likely to cause another fault in seeking the remedy. But my patience was finally rewarded with success. Though it consumed twenty years of my life, it was time well spent, for I could then say and prove by demonstration that I could effectually remedy any fault known to a violin.

Up to this time I had never made a violin complete, but had made its various parts many times. Having mastered all these difficulties I was ready for making, and began it with no misgivings as to results. My system of procedure as mapped out was plain and simple. I would avoid the faults by uniting the remedy of all faults, thus precluding the possibility of failure. This I accomplished to my entire satisfaction, nor have I at any time, through mistake or accident, made a poor or even a common violin. The excellence of a violin is absolutely under my control. The degree of perfection to which I am able to bring it is determined by the length of time I give in working out my system.

It is, of course, not to be supposed that I have one unvarying rule that will apply to all

models, and all kinds and qualities of wood. The treatment must vary as the quality of the wood and form of the model varies. It is a rare thing to find two pieces of wood just the same quality, although they may be from the same tree, or block. One would naturally think that what little difference could be found would not call for any variation in the manner of working, but that it does so require I have found to be a fact that one can not afford to overlook. All makers, so far as I know, admit the difference in the quality of the wood, but as I have never seen the difference pointed out I will do so. If a newly sawed block from the log be taken and the end examined, the grain will be found very uneven—that on one side being, perhaps, twice the size of the other. The hard grain will be found the same size in both and the difference lies in the soft part of the grain, and naturally the different grains are not of the same density or strength. Dress out a piece each of the same size from the coarse and fine grains, let the ends rest on something solid where a spring balance can be applied. You will find the coarse grain to bend more under the same pressure, and bend much farther before it

breaks. The strength of the wood lies mainly in the hard grain, and as there is more of the soft than the hard grain, the wood is proportionately the weaker. If the maker, in using these two pieces of wood, gave the same arching and graduation to both, it would be an absolute impossibility for both violins to be equally good. It must not be understood that either of these pieces are to be rejected because of their different fibre and density. They are equally good in every particular, and I would have no choice as to results, though I would have in working them, for the fine grain works with greater ease and admits of a finer finish.

It is rarely the case that I treat two violins alike, and never so unless I know the wood to be just the same, and I wish to make two violins of the same quality; then, of course, the work must be done in precisely the same manner. But in the ordinary way of working what one may believe to be a perfect counterpart of the original, it will be found to differ enough to defeat the intention. For this reason the copies of the old or any other violins are never like the ones copied. It may be better, or worse, in tone, but never the same.

The old work has been the greatest hindrance the modern makers have met with. The essential knowledge of wood in all ages has been too limited and their means of accuracy too imperfect to hope (from my standpoint) to succeed in the effort to copy any work—and especially so of the old instruments—and duplicate the tone. The condition of the wood in an old violin is radically different from wood that may have been cut at the same time and not used, even if from the same block. We will suppose this wood and violin to be two hundred years old, and a copy of the violin made from the old wood and found an absolute counterpart of the original. Will their tone be alike? Not at all. We have overlooked a vital condition, one that would require a different line of work in the new one in order to duplicate the tone of the old. We have lost sight of the fact that the old violin has been under the disintegrating effect of vibration for two hundred years. This vibration has added as much to its destruction as its age. There is also another fact that would prevent a true tone copy. The old violin is more affected by the air on account of its thinness, as the thickness of the unworked

wood has been a shield to ward off most of this action, leaving age to work the disintegration. An observing student must see the hopelessness of producing a faithful tone copy while the essential knowledge of the condition of wood is so limited, and a more limited knowledge of the work required to meet the varying condition of wood caused by time and circumstances of growth. He can also see to some extent the time that has been lost, and the hindrance to the art in their fruitless attempts to copy the old tone by any system of measurement. Some of our modern workmen have done marvellous things in the way of imitation. Their work would almost deceive the very elect. But expert workmanship in cabinet work and tone creation are not in the same class.

There is another widely extended cause for failures that I will briefly mention. The makers who work on borrowed principles will choose some certain model, select a system of graduation, adopt some particular form of bass-bar, all of which have been copied from the old makers, and in consequence are products of so high and ancient authority that a doubt of their eternal fitness has no lodging

in their minds. They embody these forms in a number of instruments, and then fall to wondering why so many of them are poor. It would be more fitting to wonder how any of them are good. To show how far such a workman is from a true knowledge of the art, we will suppose he has mastered the true system of the art, according to the demand of the wood, also according to the demand of the model, and has fully allowed for the change the varnish will make; if he uses the time honored bass-bar, he will have done well if he gets one good violin out of a dozen. Now, I will open them and put in such bass-bars as the nature of the work demands, and they will all be good. The shape, size and position of the bass-bar wholly depends on the condition of the work up to the time of putting it in. The manner of graduation depends on the form of the arching, the depth of the rib and the quality of the wood. The bass-bar must conform to these three fundamental principles. If there is not perfect harmony in working out these points, no bass-bar can be made that will make it a superior instrument, for it cannot wholly overcome any violation of the former rules.

I have spoken of a "perfect system of graduation." This is conditional. What would be perfect for one form of arching and quality of wood would be imperfect for another. If any one expects to master these complications in two or three years of apprenticeship to one who knows comparatively nothing about them his failure will be certain. To enumerate all of the points that have a tendency to prevent the higher class of work will take too much space, so I will mention but one more in this connection. I refer to the arching. This is a part of the art that has been seriously neglected, as the means of shaping the arch has been very imperfect, for I find when properly tested none are correct, and but few nearly so. Some makers trust largely to the eye to even the arching—that is, to have the right and left sides the same. While one may shape one side quite satisfactorily, it is a very difficult thing to shape the other like it. Others use callipers of the ordinary sort, which are but little better, as they are not sufficiently accurate to give true results. In the hundreds of violins that have passed through my hands for the purpose of examination, or improvement, I have failed to find one perfect. After ascertaining the

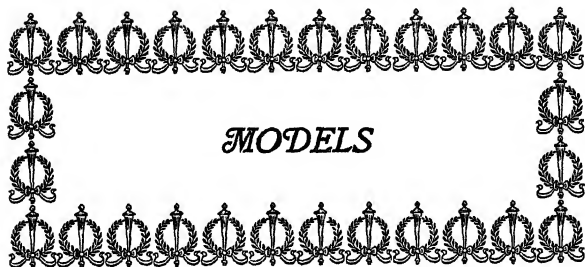
effect this has on the higher grade of violins, I perfected a mathematical system for arching, which works alike on all models. As this system was of no use without the proper tools, I also perfected a tool—or more properly speaking, a machine—with which this system can be worked out with unvarying accuracy. Uneven arching is not confined to modern makers by any means, in fact they show a decided improvement over the old makers in this respect. I have the measurements of a Cremona violin now in the hands of a soloist of ability. I took it on account of the extreme disproportion. The arching of the right breast was a quarter of an inch the higher; the length of the right bout, “Music,” “Gal,” “10,” or “C,” was three-eighths of an inch the longer; the right “f” hole was three-sixteenths the wider; in fact, it looked as if the half of two violins had been joined. This is, of course, an extreme case. The question will be asked how I reconcile this with my objection to uneven arching, as it will be assumed that the soloist would have none but a fine instrument. I admit that the violin was fairly good, but it fell far short of being first-class. The quality of the E and A were metallic, while the D and

G were broad and smooth. If the graduation had been in any other violin it would have made that violin worthless, or if the quality of wood had been different the result would have been the same. My solution of this is, the tone quality of this violin was an accident. This violin might have been copied a thousand times and not one of the number would have been good. If the arching is uneven the graduation must of necessity be the same, and if so, the highest success cannot be obtained, as any departure from accuracy in this respect detracts from its excellence in the same ratio. Within the last four years I have reconstructed 126 violins, embracing nearly all models, and from the hands of most of the noted makers. I have called the attention of the gentlemen before mentioned to the most of them, and not in one instance have we found one that at all approached even graduation. Four of this number were genuine Cremona violins, and I found them more uneven than modern instruments of the better class. Many of the others were made by the best English, German, French and American makers, but I have found no exceptions to the general rule. It is years since I found that accuracy in this part

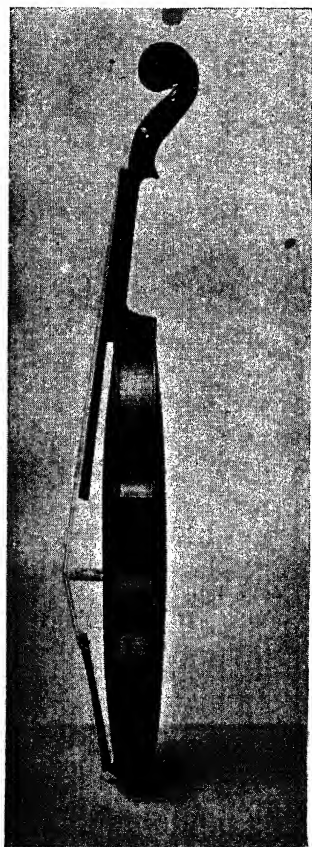
was essential, and as that could not be secured by any device then in use, I set to work to make one that should have the desired effect, and the machine before mentioned is the result. With this I can secure a degree of accuracy that was impossible before, and accomplish more in an hour than I could formerly in a day. There are many other points of construction that could be profitably reviewed, but as my aim is to throw what light I can on the most prominent and important points and expose false systems and theories, I will carry this part of the subject no further, but will take up the next in order.



CHAPTER V.



THIS PHASE of the violin question has caused more controversy than any other, from the fact that many have taken it up who really know nothing about it. All the old models have their advocates, and each follower of his respective ideal is equally positive that his choice is the best, and will argue learnedly and otherwise (mostly otherwise) to any length to prove this contention. Of late years the Stradivarius model has come prominently to the front. Just why I am unable to say, and I very much doubt if a logical reason can be given. It is not because its lines are more beautiful, for in fact some of them are hard and ungraceful. It is not because his violins are better than others, for



THE "OAKES MODEL"—Side View

it is a matter of history that all the old makers, from Gaspard di Salo down to Bergonzi, produced at least one better violin than Stradivarius. He invented nothing, he perfected nothing; neither, indeed, did any of the Cremona makers, for the violin was brought to its present size, form and general outline in the town of Brescia, years before Amati brought the art to Cremona. It is commonly believed that Amati brought the art from Brescia, which was very likely the case, although there is no direct evidence of the fact. What improvement it may have undergone was made before and during the forty years that Stradivarius served as an apprentice to Amati. It is true he may have changed the outline somewhat, but viewed as a work of art it surpasses but one of its old companions, while its modified copies surpass it in artistic lines, notwithstanding the ravings to the contrary of would-be critics who have become befogged and lost in a sea of attempted description. The other makers were all held in higher estimation until recently, and I have made several attempts to gather some fact that would justify the claim of his superiority, but have failed.

During the life of Stradivarius his work

created no great interest at home or abroad. At one time he sent a number of violins to England, where they failed to sell for \$25, while those of other makers sold for from \$50 to \$250. This difference in price has been a true indication of actual value until well along in this century. I have no desire to deprive the old artist of any honor justly due him, but in giving him all, do we not withhold honors from others more justly entitled to them? As far as I am able to judge from the facts before us, we can give him credit only for being a conscientious and painstaking workman, who was wedded to his art. If his fame is established in justice and built on the broad foundation of merit, all I am able to say adversely will not dim its lustre. That his model has a world-wide reputation is shown by the fact that the world is flooded with "fiddles" after his model, being a class of trash that is a disgrace to his memory and the name of violin. This is all the result of a fad for which there is no accounting, but like all other fads it will have its day and then die out. As far as the Strad model is concerned, it is just as good as any other, but no better. With the exception of the very high arched class that Amati pro-

duced at one time, and which Steiner copied and carried to a still further extreme, there is practically no choice as to models, from a tone-giving standpoint.

The excellence of a violin does not depend on the model. This statement will doubtless raise a wave of indignation on account of my thus presuming to doubt the time-honored belief of makers and connoisseurs. Still, I have so clearly proven the fact by hundreds of tests that I confidently reiterate the statement. With the exception of the two models referred to above, I can take any model and duplicate its qualities in a violin of any other model. So long as the air capacity is about the same, in combination with proper form, a violin can be made to reproduce the volume and quality of any other. The air capacity should be near 124 cubic inches, as that space, properly distributed, will produce the purest soprano quality in tone. When the volume is enlarged much beyond this, the violin will partake of the viola, or tenor tone—in fact is tubby—and when the volume is much reduced it approaches the other extreme in proportion to the reduction. To be able to make one model produce the power and quality of any other is a

true and infallible test of a maker's ability. If he is not able to do this, then he is surely not a master of the art. Some will think I am drawing the line rather closely. So I am, but not too close for the one who has advanced far enough to know what his work will be before it is finished, for in that knowledge lies the solving of all other violin problems. To be able to do this is proof positive, notwithstanding the glory with which the Stradivarius model has been crowned and the "gush" that has been wasted to immortalize the maker, that one model is no better than another.

If the multitude of enthusiasts must give praise and adoration, why not bestow it where it belongs, on the Brescans, who determined its general outline and other points long before one was made in Cremona, in which place it may have been modified a little. If this modification was an improvement, then for this they deserve credit; but that required no heaven-sent gift. Thousands are able to suggest improvements on inventions who could never give birth to an original idea. It is true that some of the Cremona makers enlarged their violins, but kept the proportions, and others reduced the size; but they eventually

all came back to the original Di Salo style. I find nothing that would show the Cremona makers to have been more than imitators. There is not a word of evidence to show that they understood and worked from those high and absorbing principles that they have been credited with. The beautiful science of acoustics and all other scientific principles that center in the violin, have all been worked out since the Cremona days. They have been credited with a knowledge they could not have possessed. Could they not have made violins without this knowledge? Hundreds have done so who did not know that such a science existed, and have made some fine instruments. How many makers are there today who fully understand and work from this science, and what benefit would the knowledge be to them, when there are vital points of construction of which they know nothing?

I will here give a final and indisputable proof that the secret of success lies in construction, and not in the model, and is due to the perfect harmony of the various parts one with another, the bass-bar with the graduation, the graduation according to the arching and quality of the wood, and the air capacity.

As I have before mentioned, in the last four years I have reconstructed 126 violins, not to mention the hundreds done before with the same results. This number includes models of every known make, and some unknown. Fully seventy-five of these have been of the cheapest grade of factory violins, that would average in cost not to exceed \$5 each. These violins are considered by good judges to be worth not less than \$50, now. These were made of cull wood—the trash of the factory—that otherwise would have been burned. The others were well made violins, with good wood and fine workmanship, but withal, poor ones. There are numbers of these that are valued at \$300, and none of them could be bought for less than \$100. The variation in value is owing to the length of time given to the work and the possibilities of the wood, as in some cases this had been so reduced in thickness as to leave but little room for improvement, unless the weak points were reinforced.

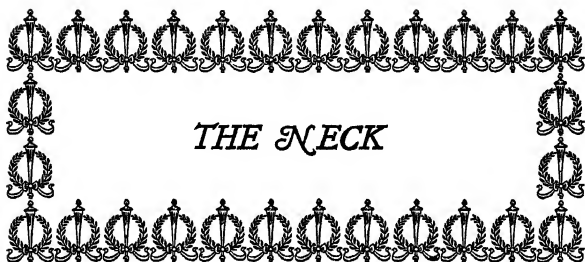
I will give one instance to show what can be accomplished in this line when carried to its fullest extent. A gentleman of this city, who is a soloist and orchestra leader of considerable reputation, had been watching the

results of my work, which so won his confidence that he placed in my hands a genuine Guarnerius for reconstruction. In conversation after its completion, he said: "The improvement is marvelous, and your knowledge of proportion must be conceded; but the old and selected wood is, doubtless, entitled to much of the credit." When I said that, on the contrary, the old wood had hindered rather than helped the result, and that I could produce equally good, or even better effects from new wood, he quietly remarked: "I will put you to the test." He shortly came back with a German factory violin, for which he paid the music firm of Winter & Harper, of this city, the sum of \$1.50. I took it in hand, worked it over inside and out, and revarnished it. Shortly after it was completed, Ondricek, the celebrated violinist, gave concerts in this city, and having heard of me called at my shop to examine my work. During his visit the instrument was shown him, he not knowing its history. After a careful test he gave it his unqualified approval, and pronounced it a work of art for its purity and quality of tone. Now in the face of all this evidence I ask, on what other grounds than the true knowledge of con-

struction can any one account for this unfailing success? There is simply no other cause to advance. The old theories of wood, model and varnish must fall before this evidence.



CHAPTER VI.



WHAT CAN BE SAID of the neck of sufficient interest to justify the use of time and space, will be asked by some, perhaps by many. I assure you the neck is of far more importance than it is generally credited with. There are many players and makers who attach no importance to the neck beyond that of convenience and beauty. If it is shapely and easy for the hand, that is all they ask. I admit that in the matter of beauty it has played a very prominent part, at least in imagination. The Cremona scrolls have been a sort of safety valve for too imaginative minds to gush over and so lessen the dangerous pressure. There are not many aware that the neck is of nearly the first con-

sideration, yet such is the case; but it does not require that exactness in work that other parts do, although an instrument is easily ruined or made by its proportions. Some argue that it has no part in the vibration, and that patent heads and keys do not affect the tone. But this is a grave mistake. As a test, clamp a pound of iron firmly to the head and try the effect. You will no longer have any doubt in the matter. Of course the pound weight exaggerates the effect, but it will enable the ear to detect the detrimental influence of metal on the head, and it necessarily follows that if a pound is harmful a fraction thereof is also harmful in the same ratio.

The tension of the strings exert a force of about eighty pounds. The neck will yield to this force if too small, and a noticeable tremble result, instead of a proper vibration. While one plays softly on such a violin, the defect may not be noticeable, but in a forte passage the neck will tremble under the extra pressure of the bow, and this tremble precludes the possibility of proper vibration; in fact the forte passage becomes the weaker of the two.

There is a wonderful difference in the quality of wood for a neck. I consider it of more

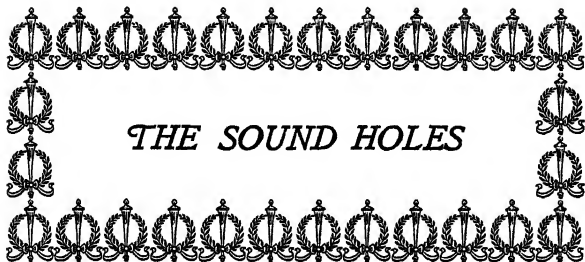
importance than that for the back. The position of the grain is a factor, also. Where the grain is vertical the neck may be made very much smaller, and still have equal rigidity; but when the neck is small and the grain horizontal, solidity of tone is an impossibility. I have met with scores of violins that were ruined by small necks. Where I have been able to convince people of this, and have been permitted to replace the small neck by one of larger dimensions, it has never failed to remedy the difficulty. But this fault must not be confounded with one of similar effect, caused by too weak wood in the body. If the wood is much too thin, the tone will tremble. This gives an exaggerated vibration and can produce no solidity of tone.

No safe rule can be given by which the size of the neck can be determined. If the condition of the wood were always the same, the proper size would be easily decided upon. As it is, it depends largely upon the knowledge and judgment of the operator. The other extreme should be as carefully avoided, as a violin can be injured as much with a neck too large as with one too small. If it is too large it seems to absorb the vibration, and however

sensitive the body may be, it would have a deadening effect, such as would ruin any violin. Many players are of the opinion that better execution and more ease can be had with a small neck, but in every case to my knowledge where a player has used a large neck for a short time, they have never been willing to return to the small one.



CHAPTER VII.

*THE SOUND HOLES*

UERY MUCH might be said about the "f," or sound hole, and much of it would be speculation, as it has been in the past. To what extent of importance the old makers regarded the "f" hole, I cannot say, as the most I have been able to gather has been purely speculative, or in the form of comment, or criticism on its beauty. As each of the old makers had his own peculiar form, it seems to have been as much of a distinctive mark as was the form of the instrument. As to whether each regarded his as possessing more beauty, or embodying the best form for results, is a matter of opinion.

The "f," like the neck, while of very great importance, requires no special accuracy of

work, yet it is essential that the size of the opening should conform to the cubic inches of air contained in the shell. If the opening is too small, the tone will be smothered, and have a nasal quality; if too large, it will have no intensity. For a violin containing about 125 cubic inches of air, the "f" should have a surface opening that would represent nearly $1\frac{1}{4}$ inches. The present form of the "f," in my opinion, has not been adopted on well defined principles, but was probably selected as a nearer approach to artistic lines than any other form. But it is doubtful if the aim for beauty has compensated for the injury it has worked in cutting away unnecessarily two and one-half inches of vibrating surface.

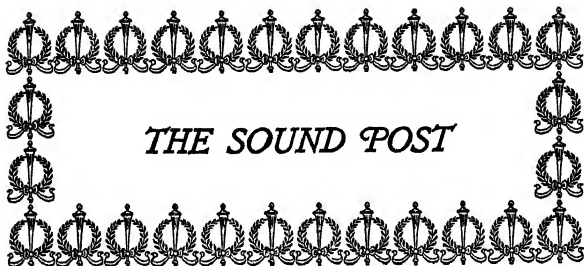
Some of the early makers had the right idea when they made the sound hole in an illeptical form, which only cut away three-fourths of an inch. There is another fault in the present form of far more serious consequence than the loss of vibrating surface, and that is the weakening of the top near where the greatest strength is required. The sweep of the "f" has cut away all the full length fibre except what is left between the upper curve of the "f's," and this is about one and a half inches, which

is all the wood there is to support the pressure of the strings, which amounts to from twenty to thirty pounds, according to the size of the strings and the pitch of the neck. The sound post and bass-bar supports some of the pressure, but the remainder is too much for the very small amount of wood to support and give the best results.

I have spent time investigating this matter, and I am fully satisfied not only that the present form is not the best, but that the elliptical form would yield the best possible results, even with the present form of graduation. It would also admit of another system that would be far superior to any now used, but which would be injurious under present conditions. Another point in its favor would be that the breast would be far less likely to split—in fact but little more than the back—and this is in itself a consideration of some importance.



CHAPTER VIII.



ANOTHER part of interest to which much importance is attached is the sound post. There is a prevailing opinion with the uninformed that there is a definite position for the sound post, but this is an error. It must be placed to suit each violin. Its position may be anywhere between the outer and inner points of the right foot of the bridge, even up to three-fourths of an inch back of it. The proper position cannot at once be determined. What would seem to be the right place today would seem totally wrong tomorrow. It should be moved only a little each time, and when the right place is found see that it remains there. Every time it is moved, it changes the form of

vibration, so requiring some time to settle to its work. I have known many violins to be nearly ruined by a persistent moving of the post. It very often produces a "wolf" that requires great skill to remove. I have had to deal with many such cases, and have remedied the fault. In some cases a long rest will correct the derangement.

While the sound post is one of the great essentials, undue importance has been attached to its position. It cannot remedy faults that lie in the construction, as such faults will always remain until the cause is removed, though a dozen sound posts were used as a remedy. Many are so impressed with its supposed regulating power that to have one fall is considered a calamity, and they will send it hundreds of miles, if necessary, to some expert to have it reset. The expert proceeds to examine the violin very critically, looks very profound (if any one is present), and then sets the post. He will charge from one to five dollars for the work, when the fact is the owner could have done just as well, for the expert has only worked on general principles.

Setting the sound post is a work that is governed entirely by one's ability to determine

the best quality of tone produced from the various positions tried. No method of measurement or calculation can determine its proper position. There is a fact, in this connection, which, if generally known, would save much time, i. e.: It is far more necessary that the post should be in the proper position in a poor violin than in a good one. To move the post in a poor violin ever so little will make a perceptible difference, while it may be moved much further in a violin properly constructed, and the change of tone not be noticeable. There are large numbers of players who seem to think the sound post and bridge are able to overcome every fault and produce all desirable qualities in any kind of a fiddle, and to this end devote all of their leisure time, and much of their employed time, in handspiking the sound post about and whittling the bridge, expecting in this way to overcome the defects caused by the ignorance of the maker. The fact of their having had the post in the same place a score of times is too trifling a matter for consideration.

The sound post has been called the "soul of the violin." Of course it is indispensable—nothing can take its place. But in my opinion

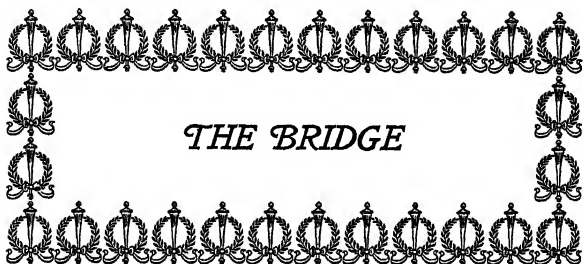
the term would be more justly applied to the bass-bar. If the post is the soul, the bass-bar is its life, vigor and strength. While the post has but one function, and performs that alike in all violins, the bar can remedy glaring defects, or ruin an otherwise fine instrument. The sound post cannot make a good violin of a poor one in any sense, while there are numberless poor ones that could be redeemed and made high-grade by the adoption of a bar, such as the condition of the violin demands.

While the importance of the bass-bar has seemed to be fully understood, facts prove to me that the A, B, C of its importance has not been passed. Its capacity to govern tone quality is almost limitless. It can be made to impart extreme harshness or the mellow smoothness of age. It has long been an accepted theory that all new violins have that raw, roughness of tone that is so very unpleasant and which renders them unfit for an artist till after years of use, but with a full understanding of the governing power of the bass-bar this is no longer a fact. If a violin is worked out scientifically it will not have that objectionable quality. I have not made a violin in sixteen years in which the newness can be de-

tected after the first few months, and in many of them not after a week of reasonable playing. This fact has been fully conceded by some of the first artists of this and other countries. It has also been claimed that if a violin should have this finished quality when new it will soon degenerate. There are such violins, but the rule does not hold good with instruments properly made. So far as my work is concerned, I have not made a violin in twenty years that has not steadily improved, to which fact the owners are willing and anxious to testify.



CHAPTER IX.



WHILE great importance has always been attached to the bridge, it has not had the thoughtful attention which it deserves. All prominent makers and players have exercised their skill to the perfect fitting of the bridge, for without this no instrument can be at its best. Many, however, have fallen into error by expecting this to overcome faults in violins that are in no way affected by the bridge. Nevertheless, there are certain relations of the violin and its bridge, which, so far as I know, have never been investigated.

For some years I have realized the importance of study upon this matter, but other points in violin building, until within the last

two years, have kept it in the background. During this period I have given it careful consideration. My researches established the fact that each violin requires a bridge peculiar to itself, as to thickness and particularly as to height. Tests also showed that as I approached the true line of height, the tone improved, but as I went beyond this its quality was impaired. Nor was this improvement slight; it was so great as to be almost incredible.

The universal method has been to fit the bridge to the fingerboard without regard to what the condition of the shell required as respects the bridge. If the best results were obtained in this way, it was by an accident which would not occur once in a hundred times. My experiments and investigations prove that the height of the bridge must first be ascertained, then the neck must be set to fit the bridge. This, however, is hardly practicable, for a violin must be completed in the white before one can get the height the bridge should have. Whether a system of measurement for this can be worked out is a problem I have not solved. I am satisfied, however, that four conditions govern the height of the bridge, viz., the height of the arching, the air capacity of the

shell, the texture of the wood, and the system of graduation. Faults in construction cannot be remedied in this way, but if a violin is built on true acoustic principles, the improvement that can be made is simply astounding.

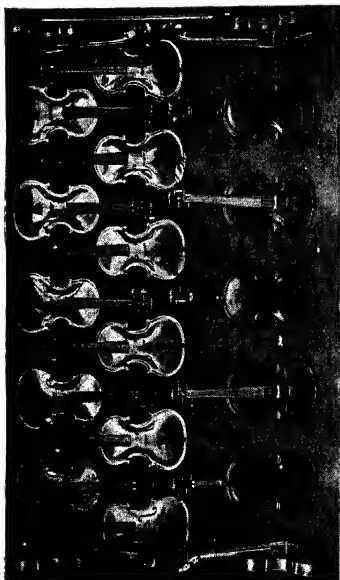
I lately took an ordinary \$10 "fiddle" and worked with the bridge till I got its best possible tone. The improvement was but very little, though clearly observable. Then I reconstructed the instrument, remedying its faults so far as possible. The tone was now three-fold better. But further investigation showed that reconstruction had so changed the conditions as to require a bridge of different dimensions. When this was done, and the neck properly adjusted, the violin was at least ten times better than at first.

I also experimented with a violin of my own make, which has been well known for two years, working only with the bridge and neck. The improvement was so remarkable that it was only by the peculiar wood in the back I could convince several experts that it was the same violin.

In making my last two violins, I applied this system with much extra labor, being compelled to remove the necks while in the white,

and after the varnishing. But I was well repaid for all this, as they are easily the best instruments I have ever made. I have since applied this system to several reconstructed violins with the same gratifying results. Several artists have followed me through these experiments with absorbing interest, and they warmly approve the results. The system is, of course, yet in a comparative crude stage—I may say “cut and try period.” Still, it is something to know that an additional means of improving the “king of instruments” has been brought to light. When this has been reduced to a practical science, it will require skill, judgment and a fine ear, trained to discriminate tone quality, to successfully apply the system. A failure in any one of these points mentioned will be as fatal as a lack of the whole. Skill is the least essential. Judgment should be gained as the result of long and close investigation, and even with this in perfection failures must result without the practically cultivated ear to detect a fault and determine the best tone. The judgment must then locate the difficulty, and skill work the remedy.

A first-class violin can only be produced by a harmonious union of all its various parts.



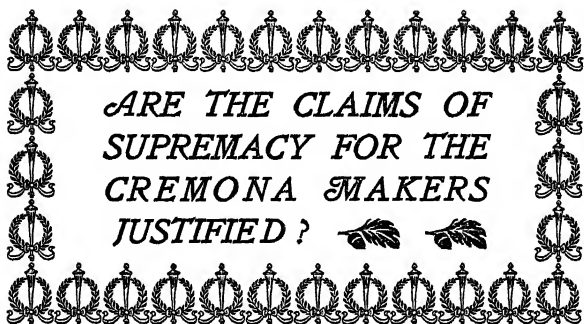
CABINET OF THE "OAKES" VIOLINS

If seven-eighths of the parts were perfectly united, and the one-eighth is faulty, it can never be a perfect violin till the fault is remedied. The work may just as well have been done by guess, trusting to accident for results. It is safe to say that all the best violins of the past have been produced in this way. The unsatisfactory consequences of guesswork falls principally upon the buyer. Scores of makers have built up a towering reputation by having produced one, two and perhaps three fine violins, and the balance of their life's work have classed from poor to medium. These would have remained on their hands, or sold for amounts that would not have paid shop expenses, had it not been for the one or two that made their reputation. A large majority of buyers are governed by the reputation of the maker, regardless of what excellence the violin may really possess. Many such instances have come under my own observation, where a child might have seen the worthlessness of the instrument. So long as this class of people are satisfied with a big reputation and a poor violin, just so long the spur will be withheld that would force the makers out of guesswork into unfailing lines of success.

With this ends the work as first contemplated. I have had two prominent objects before me throughout, viz.: Facts and brevity. Twice the space could have been filled with the same matter, perhaps interestingly, but without additional information. The facts are largely yet to be confirmed, but that they will eventually be so I have no doubt. I have shown no respect for falsifiers, nor worship for the supposed genius of the old makers. The inclination to offer this worship has lessened with the years of my investigations. To justify the position I have taken in this respect, I will add what at first I had no intention of doing. This will be as an appendix.



APPENDIX.



I HAVE been advised by those who have turned from their adherence to old ideas not to touch this subject, as the fame of the old makers is so firmly established that any attempt to shake the public belief in it would weaken the points I had already gained. Others, however, to whom I have outlined the evidence have so thoroughly indorsed the views and the position I have taken that I have decided to submit the evidence.

We are living in an age of research and investigation. If error finds a place in mind or matter, it is being brought to light and swept away. Error hinders proper development, while truth is the loadstone that draws out investigation for its own sake. Age can not hal-

low an error sufficiently to justify its continuance when discovered. If the old makers' abilities have been accorded a position that facts cannot justify, they are no more entitled to retain that position than one would be if a like mistake occurred yesterday. Holding these views, I will proceed to give the evidence that to me is all-sufficient for the conviction of a great error in this regard. In answering the above question, I shall only use those facts that are well known to every well informed student of violin history. I will examine and see how far these will sustain the conclusions formed from them. But first I have a word to say about those who have set themselves up as violin judges. If I should include all of this class it would embrace all who ever played a tune on a violin, besides thousands who have never done so. I have yet to see the person who can play at all who does not have a ready opinion of a violin and a proportionate eagerness to pit it against all comers. With these I have nothing to do aside from noticing the annoyance. How many whose opinions have set the stamp of pre-eminence on the Cremona violins were qualified to judge? I venture to say that not one in fifty could prove his ability

by a proper test. Those of seventy-five or a hundred years ago were no better qualified, to say the least, than those of today. By repeated tests I know the best of our present judges are unconsciously influenced in favor of the old instruments, and forty-nine out of fifty will reverse their judgment of the same violin when they are tested behind a screen where they cannot be influenced by sight. That we are so influenced I know to be a fact, in spite of our determination to be impartial. Not only are we partial in our judgments, but as a general rule we are influenced more by our individual likes and dislikes than should be the case. After a most careful analysis of various judgments upon the same violin, I am convinced that there is nothing more unsatisfactory. No two tastes are identical, and the consequence of this must be a difference in opinion on tone quality. As it now stands a judgment can be given only in a general sort of way. A mechanical test is the only absolutely true method by which the qualities of a violin can be determined upon. Enough is already invented to perfect this if brought to bear on the question. However, we will leave it for future development.

We do not know just when the fame of the Cremona violins began to spread, but the cause should be common property, as I will make plain further on. While they may have been better than the violins of a later period, I think their quality was overestimated, because of their great age. Not that they were rendered better thereby, but they were valuable as relics of an almost forgotten age. Their makers had been lost to general knowledge, except in their own country, and when their histories were collected and written out (of which very much was imaginary), it proved an alluring fad to which the wise and the unwise paid willing homage. Some allowance should be made for the people of that period, for almost a miracle had been wrought in these violins, and they were quite justified in their enthusiasm over the wonderful improvement that had been effected. There was none of this enthusiasm before the improvement, either over the violins or their makers. But when that generation had passed away and succeeding ones had lost the fact of these improvements, or ignored them, then the worship of the old makers began. How many of the judges during the last seventy-five or one hun-

dred years have seen a violin just as it left the maker's hands, by which they could form such a high estimate of the maker's ability? I am safe in saying not one, unless it has been within the last two years; and that is very unlikely, as there is but one in existence. One was found in Italy in 1897, where it had been lost for very likely 175 years. That it should have been lost this length of time seems probable, for had it been known at a much later period the fame of its companions would have brought this before the world also, and it would have undergone the same improvement as the others. Another evidence of its loss is its perfect preservation, the only mar being a break in the perfling of half an inch next to the saddle; otherwise it is just as it left the hands of Stradivarius in 1690.

.When we find one of his violins toward the close of his work and life, it is safe to conclude that it is a fair sample of his work. I have two photographs of this violin. One is the top and the other is the side view, which show the details quite plainly. The construction of this violin confirms the statement, so minutely described in various works, that all the surviving Cremona violins have been worked over, but

to just what extent no one now living knows. It is well known they have all had new necks, fingerboards and bass-bars. The evidence of this is beyond doubt. In some instances entire new necks were put in, and the old neck handed down for many years. But in most cases they were cut off at the peg box and grafted on to the new neck to preserve the scroll. In most of the imitations of old violins you find this especially attended to, and it is sometimes hard to detect the imitation.

Judging from the appearance and condition of the wood of the old violins that have passed through my hands, I am satisfied they have been more or less regruated, in addition to other changes. It needs but a glance at these photos to show that the old necks and fingerboards would be of very little use at the present time, as the violin could only be played in the first position. This neck is a confirmation of the statement that "all the violins until after the Cremona era were made to play only in the first position." The neck is something of a wedge shape, small at the nut and nearly two inches thick where it joins the body. The neck has no pitch, but is on a straight line with the ribs. The fingerboard is also a wedge,

being a sixteenth of an inch at the nut, and about three-fourths at the body. It requires this wedge shape to make the slant for the bridge. The fingerboard is three inches shorter than those now in use.

I have elsewhere tried to show to some extent the importance of the neck in governing tone quality; that in many cases its size may make or destroy a violin in this respect. There is no part of the violin to which I have given more careful study than the neck. For three years it was a matter of continued investigation. I found it to be in itself as sensitive to change as any other part through its effect on the violin. How any one claiming a knowledge of violin science could so far disregard the principles of acoustics as to put such a club in place of a neck is, to put it mildly, very astonishing. I make the following statement in all confidence: If one should transfer this neck to any of our modern violins, or to any of the old ones that have had new necks, it would reduce its tone value by at least one-half.

These facts make it very evident that we cannot judge of their (the old makers') ability by their still existing work, for all the evidence points to the fact that all their work has

been much improved since their death. This leaves us nothing from which to form our judgment, and there is not an opinion on record, to my knowledge, given during their lives from which we can gain a correct knowledge of the merit of their work; and if there were such an opinion it could only have reference to that period as they understood violins at that time, and not to the advanced standard of today, or the standard that was reached after these old violins had been reconstructed.

I think the evidence so far sustains the conclusion that these violins were greatly improved by the new necks. I have seen nothing which would lead one to suppose this change in the neck was for the purpose of tone improvement, while there is evidence that it was a matter of necessity, for the following reason: When the art of playing advanced from the first to the third position it became necessary to change the shape of the neck, as the original was so large at the third position that freedom of execution was out of the question. Then came the small and shapely neck now in use. As is well known, the concert pitch of that time was three tones lower than our present concert pitch. With this low tension of the

strings, and because of the straight neck, there was only a very slight pressure from the strings upon the bridge—it would not exceed ten pounds—while the average pressure of a modern violin is about 24 pounds. Under the former conditions it would be impossible for a violin to have brilliancy or power. It would only produce a very light, soft tone, and would have a response so slow that a rapid execution could not be made. The new neck has not only made it easy to play the advanced music, but has developed a totally different quality of tone. Under the latter conditions the instrument would now have a brilliancy and breadth that would have been impossible with the old neck. Its brilliancy alone would have more than doubled its tone value.

But this change had developed a difficulty which must be overcome. The top was found to be too weak to stand the extra pressure of the strings, caused by the pitch given the neck and the higher tone standard that had been adapted. To remedy this was imperative, and there were but two ways for its accomplishment, either a new top or a new bass-bar. They chose the latter, and this was the most fortunate thing that could have happened, as

in the bass-bar lies the remedy of more faults than in any other part of the violin. I contend for this fact, and have demonstrated its truth to scores of men whose opinions could not be bought nor their intelligence hoodwinked. When these changes were finally completed, the Cremona violins *for the first time took the standard they have held since*. So whatever degree of excellence they now possess, or may have had since this reconstruction, the *makers* of these violins *are not entitled to the credit*. If these changes had been the result of deep study, the one who worked them out would have deserved far more credit than those who made them; but as the improvement was the result of necessity the credit is lost, unless it be given to the students who advanced the art of playing to the third position, for as long as these instruments were equal to the requirements of the music they were not improved.

I find some who are not so well informed in violin history as they would have it appear, who dispute the fact of their having been thus rebuilt, and in any way benefited. For this class I will add other evidence that must be conclusive, even to them, while it may be in-

teresting to others. If the fact is established that the old makers did turn out their violins with such necks, it follows that they must have had new ones at some time, and if this is established they will be compelled to accept the other improvements. Cremona was the center from which the art of violin making radiated. Those having acquired the art at Cremona undoubtedly worked on the same principles their teachers employed. Whether this knowledge was gained by direct instruction or by observation is of no consequence, so long as they carried with them the true Cremona principles. The first place to which I will trace this knowledge is Norway. I have not been able to obtain the exact period of its introduction there, nor the name of the maker, through lack of time on my part. I have previously mentioned the name of the Rev. Mr. Waaler, to whom I am indebted for much Norwegian violin history. He assures me that violins were made in Norway as early as the close of 1600, and is of the opinion that they were made at a much earlier date. These violins are perfect counterparts of the recently discovered Stradivarius of 1690. These are the violins I have referred to that could be bought so cheaply on

account of their age. These violins were not only made at that time, but have continued to be made more or less down to the present day. They are known as the "Cremona parlor violin," and are made to play only in the first position. They are made in two classes. One is the parlor violin proper, and the other resembles the viola de Gamba, but the necks are the same old clubs.

Some two years ago Mr. Waaler sent an order to Knute Elfson, the celebrated Norwegian maker (whom I have already mentioned) for a Cremona parlor violin. The order was filled by Elfson and the violin is now in this city. I have carefully examined this instrument, and must say, as regards workmanship, I have never, or rarely, seen its equal. But it embodies no scientific knowledge in its construction. The neck is a perfect copy of the old Strad. It also has the short fingerboard. The strings are very small, being tuned to the old Cremona pitch, three tones lower than the present pitch. In this we have a direct line of work that dates back to the Cremona days. There is no break in the connection, nor does it come through merely one channel, as there is in this city another violin, exactly the same

except as regards the expert workmanship. This latter instrument was made in a remote portion of Norway, and its maker had no knowledge of Elfsön except by reputation. This violin is a true copy of the Cremona parlor violins.

I will give one more proof, though it is hardly necessary, as it must be clearly evident that the old makers produced only this kind of instruments. While it is very likely that Steiner was the first to take the art to Germany, the date is somewhat doubtful. It is quite evident that he was not the only one, as scraps of history point to the fact of other workmen in various parts of Germany, but there is nothing to show that they gained their knowledge at Cremona, aside from their perfect duplication of the Cremona work. Yet this might have been obtained from others who had acquired the art at that place. It is certain that copies of the Cremona work was produced as far back as the beginning of 1700, as we find one Christian Frederick working in the town of Klingenthal in 1740. Mr. Soderberg of this city brought me an old violin to be fitted up, as it was quite dismantled, and had been for a number of years. After cleaning the

label the inscription was made out as follows: "Christian Friedrich, Doerffler, in Klingenin-al, 1740." I asked Mr. Soderberg if he could give me its history, to which he replied: "My great-great paternal grandfather bought the violin from its maker at Klingenin-al, Germany, and brought it to Soderberg, Sweden, where our family lived. The family name was then Nelson, and remained so till the present generation, when it was changed on account of names in that locality. It was then changed to Soderberg. The violin has never been out of our family, and has been handed down from father to son. It was brought to America a number of years ago, and then taken back to Sweden, and has only recently returned to this country. I know the violin is of no account, but we would not part with the old relic." This violin is in every way like the Strad of 1690, except that the fingerboard was replaced by one of modern shape some twenty years ago. I fitted it up and tuned it three tones lower, as it was first made to be, and I found it to have the quality of tone I claimed the old violins must have had before this improvement.

There is much more that could be offered in evidence, but it would be superfluous. If the

facts already submitted are, not enough to prove an error in former opinions, the remainder would be no support to the evidence, as it partakes of the same nature. I think the above facts are sufficient to show that the old makers are not justly entitled to the exalted position where modern writers have placed them.

In making this I do no injustice to the old makers. I have given them credit for all they would ask were they here. They were abreast with the demand of their day, and no higher credit is due them. But as in everything, the standard took higher grounds and the quality of the violins were not equal to the demand. Then came the improvement which met this demand, and so it stands today, and, in my opinion, will meet the requirement for all time. But it will not be met by the old instruments. I freely grant their past supremacy, but what I most emphatically contend for is the impossibility of their retaining their once high standard in their extreme age. Neither will the violins of today, by reason of their age, fill the demands of two hundred years hence.

THE END

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